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DETAILED DESCRIPTION

[Detailed Description of the Invention]

Technical field this invention relates to the ink jet recording device which has the removable loading section with a posture whose flat structure of the corresponds mostly an ink jet recording device and an especially flat and flexible ink receipt object with a horizontal plane.

the information which should record the ink which is a liquid with an ink jet printer from the conventional technical former -- therefore, it is made to collide with a form in the form of a drop, and the information on an alphabetic character, a picture, etc. is recorded as a dot.

Therefore, a liquid must carry out **** storage of the ink like the gasoline in an automobile, and since a perimeter will be soiled when ink disperses further at the time of the ink regurgitation, it must store in an ink container so that ink may not leak out to vibration or an impact. Moreover, since it must store so that the physical characteristic of ink, i.e., surface tension, viscosity, PH, etc. may become a fixed value, it must be made to have to prevent evaporation of the component of ink, and deterioration as much as possible. Moreover, in the case of the ink jet printer of the type which makes ink breathe out, it is required by making ink pressurize and breathe out, being charged alternatively, not recording [deflect a drop,] it, but making an electrical potential difference impress, only when record is required to keep a liquid ink side constant and to make it maintain at the same pressure as atmospheric air.

On the other hand, the ink residue in an ink container carries out an additional supplement few at a ***** case, or the need of exchanging an ink container arises.

Structure which was illustrated as an ink stowage container to which these conditions are satisfied in the 1st [**] Fig. R> Fig. and Fig. 2 is known. Namely, structure and intermediary **** which make the derivation pipe 5 list which ink 2 was contained in the storage bag 1 of 3 layer structures, contained that whole in Fig. 1 in the ink cassette 4 which formed the air hole 3 for this ink storage bag 1 whole, and has been arranged in the ink storage bag 1 draw ink 2 outside through a rubber stopper 6. Ink 2 is taken out by specifically connecting the insertion needle 7 to the derivation pipe 5 led even to the rubber stopper 6. This ink storage bag 1 consists of internal main bags 10 made with the external protection plastics thin film 8 made of nylon whose thickness is 5-10 micrometers, the aluminum thin film 9 with a thickness of about 10 micrometers which prevents deterioration by ultraviolet rays etc. in an ink evaporation list, and the polyethylene thin film of 50-70-micrometer thickness, as shown in Fig. 2 .

Thus, in the case of the constituted ink stowage container, supply of ink will be performed by replacing a case thru/or the whole cassette, and will be thrown away into it using an old cassette. Moreover, the ink storage bag 1 is a flat bag, and change of the oil level of ink is a maximum of about 10mm, and it is constituted so that change of a pressure may be made into min, until it becomes empty from from, when full.

Thus, when recording by connecting the constituted ink stowage container with an ink jet printer, it is known that printing concentration will become [the residue of ink] few suddenly printing impossible at the time of *****, without becoming thinner and thinner. It is impossible to distinguish whether such a printing impossible phenomenon has [of a ***** sake] whether printing according [are generated also when an impact etc. is added to a device, and] to an impact is impossible, and a nonprintable ink residue few. Therefore, also in order to distinguish the printing impossible by exchange or the impact of supply of ink or an ink storage bag, it is necessary to tell a user about the residue of ink correctly.

A device which was illustrated in the 3rd drawing 3 Fig. although the liquid residue in a liquid stowage container generally detects conventionally is used. That is, by the device illustrated to the 3rd drawing 3 Fig. (a), the float 12 which contained the magnet in the by-pass 13 of the liquid container 11 floats, the by-pass 13 is countered further, and the reed switch 14 is arranged.

If the liquid 15 in the liquid container 11 decreases, the float 12 in a by-pass 13 will detect an ink residue by descending according to the oil level of a liquid 15, and operating lead SUTSUCHI 14. When use the luminescence means 16 and the light-receiving means 17 instead of a reed switch 14 by the device illustrated in the **** 3 Fig. (b), the residue of a liquid is detected, liquids like opaque ink decrease in number, and it becomes below predetermined level, and the light-receiving means 17 receives the light from the luminescence means 16, it is the approach of detecting the residue of a liquid.

By the device illustrated in the **** 3 Fig. (c), two conductors 18 are inserted into a liquid 15, the resistance change by reduction of a liquid 15 is detected, using this as an electrode, and it uses that there are few residues and resistance goes up suddenly at the time of *****.

However, such a conventional liquid residue detection approach is not applicable to residue detection of the ink contained by ink stowage container flat type which was illustrated to Fig. 1. Because, this kind of ink stowage container is for being made to lessen change of the water level of a liquid as much as possible, in order to make an ink pressure regularity.

Therefore, this invention aims at offering the ink jet recording device which can detect the fall of an ink residue certainly, without removing such a conventional fault and being influenced by the operation mistake etc. according to easy cheap structure.

The detail of this invention is explained based on the example shown in the 1st [or less] example drawing.

Fig. 4 and Fig. 5 explain one example of this invention, and in order to give explanation intelligible, they show the condition that **** penetration of the hollow needle formed in the body side of a printer (not shown) was carried out into the ink bag of an ink cassette.

In Fig. 4, the same sign is given to the same part as Fig. 1, and the explanation is omitted.

The derivation pipe 5 for making ink 2 draw to the body side of a printer is formed in that edge at the ink storage bag 1 built in this ink cassette 4, and therefore, this pipe 5 is held at the rubber stopper 6 inserted in opening of the ink cassette 4, in order to prevent an ink outflow.

The hollow needle of the metal shown with a sign 7 on the other hand has reached in the ink storage bag 1 through the rubber stopper 6 and the derivation pipe 5, and feeds an ink jet printer with the ink in the ink storage bag 1 through a pipe 25. Moreover, this hollow needle 7 contacts a metal plate 24 with the maintenance base 23, and maintenance immobilization is carried out.

Moreover, into the ink storage bag 1, the electrode 19 is inserted from the location of the hollow needle 7 and the opposite side, and edge 19a of the electrode 19 is taken out by the table section outside the ink cassette 4. Edge 19a taken out by the outside [this] table section touches the contact piece 22 with which the covering device material 21 was attached and the rotation habit was counterclockwise given centering on the shaft 20.

The contact piece 22 is led to ink residual detection equipment and 26 for the metal plate 24 through lead wire 27 through lead wire 28, respectively. Moreover, a sign 29 is information equipment, it answers a signal from ink residual detection equipment 26, generates a sound at a lighting display or a buzzer, and tells an ink residue thru/or survival.

Hereafter, actuation of the ink residual detection equipment of a configuration as mentioned above is explained.

If a predetermined electrical potential difference is applied between the hollow needle 7 and an electrode 19 in the condition which shows in Fig. 4 first, a current will flow through ink 2 among both. Ink residual detection equipment 26 detects the resistance between the hollow needle 7 and an electrode 19 by measuring the magnitude of a current. Ink 2 is consumed, and resistance is boiled, therefore the value becomes high. That is, the amount of ink 2 can be known by getting to know resistance.

As for the ink bag 1, a top-face inferior surface of tongue laps with the sectional view showing [5] the condition that all the ink 2 of Fig. 4 was consumed, and ink 2 in the meantime hardly exists. The resistance between the hollow needle 7 and an electrode 19 turns into a value near infinity in this condition. At this time, if ink residual detection equipment 26 is required at the same time it therefore warns the information means 29 of it detecting that resistance is high and there being no ink, it controls the mode of a recording device.

As mentioned above, while is used for ink residue detection of this invention, and the hollow needle 7 is used for the electrode. The hollow needle 7 will contact the ink 2 in the ***** ink bag 1 through a rubber stopper 6, if an ink cassette is set in a recording device. That is, since a detection means is constituted if the electrode of a piece is otherwise prepared in the ink bag 1 by using a hollow needle as an electrode, it has the effectiveness that it is not necessary to prepare two electrodes in a narrow ink

bag.

Moreover -- since the hollow needle 7 constitutes the outlet of the last of the ink bag 1 -- ink 2 -- ** -- since contact is performed until just before ink 2 is lost, it has the effectiveness that it is possible to detect correctly that there is no ink.

In addition, although the structure of preparing two electrodes for ink residue detection in the ink derivation pipe 5 side is also considered The ink of a certain amount tends to remain with such structure around ink derivation pipe 5. Although the ink residue in an ink stowage container fell, a current flows through the ink which remains in inter-electrode [two], and it is expected that the fall of an ink residue may not be detected.

Therefore, a flat and flexible ink stowage container is horizontally arranged like **** and illustration. Moreover, by adopting the structure of preparing the hollow needle 7 and the 2nd electrode 19 which function as the 1st electrode for ink residue detection in the both ends of a flat and flexible ink stowage container When an ink residue becomes small, the flow of the 1st and 2nd electrodes can be intercepted certainly, and positive ink residual detection is attained.

Moreover, since it constitutes so that an ink residual detector may be completed when the loading section is closed with a lid as mentioned above in the condition of having equipped with the ink stowage container in the ink jet recording device, Since ink residual detection will be performed only when the loading section is closed with a lid and it loads with an ink stowage container certainly into an ink jet recording device, The fall of an ink residue can be certainly detected according to easy cheap structure, without incorrect detection of the ink residue fall accompanying the loading mistake of an ink stowage container occurring.

Moreover, the wearing condition of an ink stowage container is also detectable by adopting such a detector style.

Other examples of this invention are explained with reference to Fig. 6 below the 2nd example. In this drawing, the same reference mark is given to the same part as the 1st example, and the explanation is omitted. The center section is covered with the metal curve from which what is shown with a sign 30 in Fig. 6 constitutes an electrode by the insulating material. end 30a of said electrode 30 is exposed into ink 2 -- having -- other end 30b -- the derivation pipe 5 -- a connoisseur -- a rubber stopper 6 is further penetrated from an intermediary, and it is taken out by the exterior of the ink cassette 4. Moreover, edge 30b of an electrode is bent by the periphery of a rubber stopper 6 in the place which came out of the rubber stopper 6.

31 is the ring part material which consists of a metal, and contacts edge 30b of said electrode 30 in the condition which the hollow needle 7 penetrated to the rubber stopper 6.

Since a current will flow among both through ink 2 if an electrical potential difference is built between said hollow needles 7 and said ring part material 31 in the state of the above, said ink residual detection equipment 26 can detect the electric resistance of ink. Moreover, there is no residue of ink, the flow between the hollow needle 7 and an electrode 30 is lost like the 1st example, the condition is detected by ink residual detection equipment 26, and a ***** case is reported by information equipment 27.

The electrode of this example has the very easy structure which penetrated the rubber stopper 6, put the metal thin line in the ink bag 1, and bent the heel to the rubber stopper periphery further.

Moreover, the tight-binding force of a rubber stopper 6 commits the part into which edge 30b of an electrode penetrates a rubber stopper 6 around edge 30b of said electrode, and it has the outstanding effectiveness that ink 2 does not leak outside.

Since it constitutes according to this invention so that an ink residual detector may be completed when the loading section is closed with a lid in the condition of having equipped with said ink stowage container in the ink jet recording device so that clearly from the explanation beyond effectiveness, Since ink residual detection will be performed only when the loading section is closed with a lid and it loads with an ink stowage container certainly into an ink jet recording device, There is outstanding effectiveness that the fall of an ink residue is certainly detectable, according to easy cheap structure, without incorrect detection of the ink residue fall accompanying the loading mistake of an ink stowage container occurring.

Furthermore, according to this invention, it is equipped with an ink stowage container so that the flat field of an ink receipt object may be mostly in agreement with a horizontal plane. Since an ink receipt object deforms from a center and finally sticks it in a central part with the fall of an ink residue, when an ink residue falls, to inter-electrode [two], a current will not flow certainly, and there is [outstanding effectiveness that the fall of an ink residue is certainly detectable].

[Translation done.]

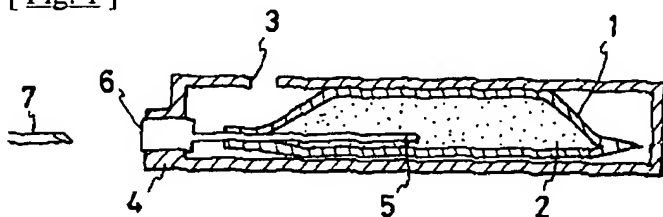
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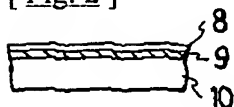
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DRAWINGS

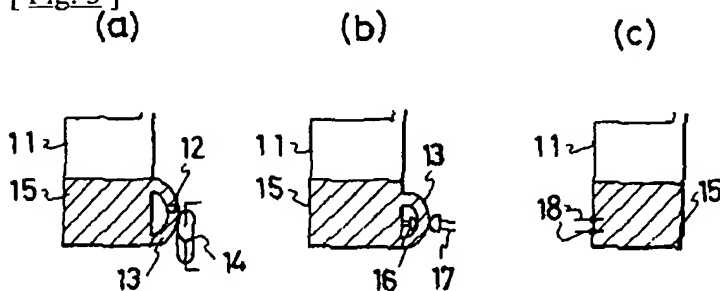
[Fig. 1]



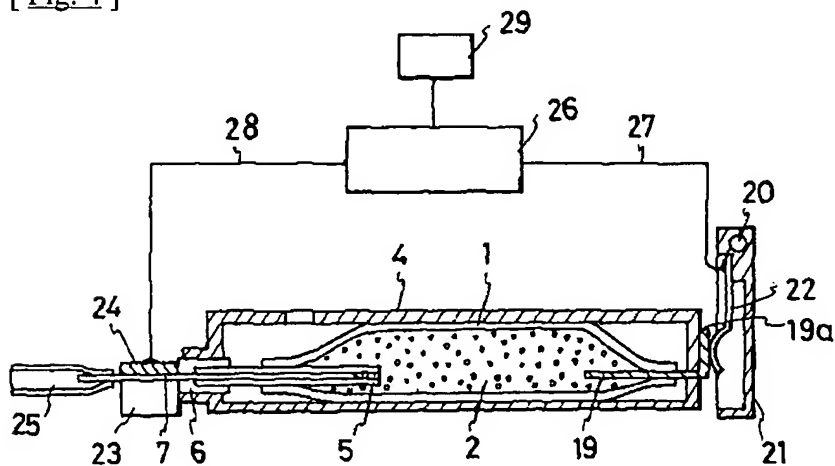
[Fig. 2]



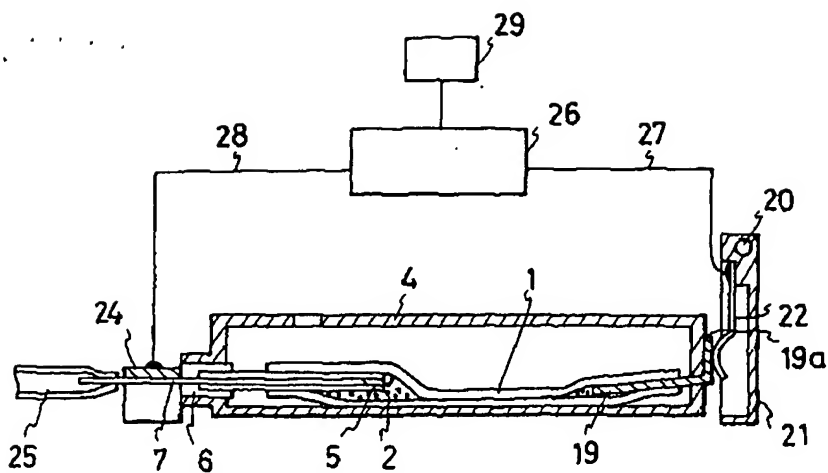
[Fig. 3]



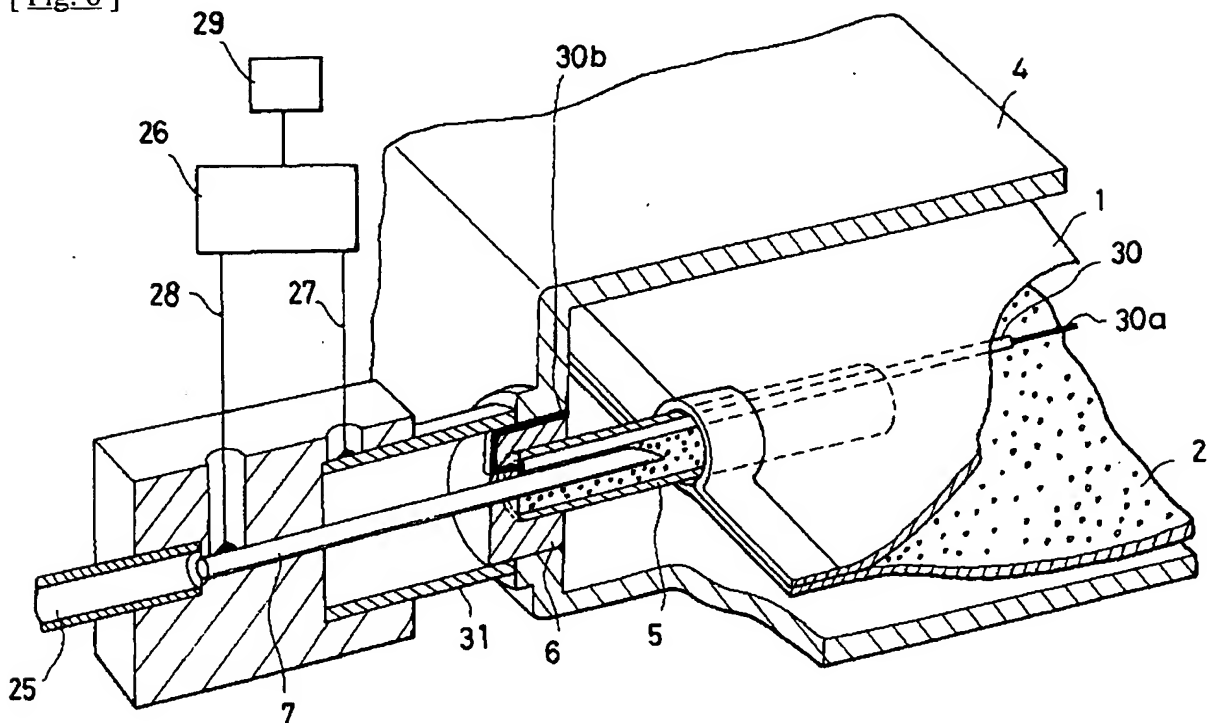
[Fig. 4]



[Fig. 5]



[Fig. 6]



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CLAIMS

[Claim(s)]

[Claim 1] The ink derivation section which contains the flat and flexible ink receipt object with which the volume decreases with consumption of ink, and derives ink from said ink receipt object, The ink stowage container with which the other end was equipped with the electrode currently pulled out outside while it was prepared in said ink derivation section and opposite side and the end touched the ink of the ink receipt inside of the body The loading section which makes wearing possible by making it slide so that the flat field of said ink receipt object may be mostly in agreement with a horizontal plane, The hollow needle for ink derivation which has the electrical conductivity which is inserted in said ink stowage container ink derivation section by said loading section being equipped, and derives the ink of said ink receipt inside of the body, Where it was prepared in the covering device material which opens and closes the inlet port of said loading section, and this covering device material and said loading circles are equipped with said ink stowage container, when said covering device material is closed, the conductor in contact with the electrode with which said ink stowage container was equipped -- the section, and said hollow needle for ink derivation and said conductor -- the ink jet recording device characterized by having the ink residual detector which detects the residue of the ink of said ink receipt inside of the body by electric flow with the section.

[Translation done.]